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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,516	03/19/2004	Arun Kwangil Iyengar	YOR920040025US1	7509

7590 09/21/2007

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EXAMINER	
PHUNG, LUAT	
ART UNIT	PAPER NUMBER
2616	
MAIL DATE	DELIVERY MODE
09/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/804,516	IYENGAR ET AL.	
	Examiner	Art Unit	
	Luat Phung	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *28 June 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The pending claims 1-25 are presented for examination.

Claims 1-25 are rejected.

Claim Objections

1. Claims 1 and 17 are objected to because of the following informalities:

Regarding claim 1, line 3 refers to "a request"; is it the same as that mentioned in line 1? If so, it is suggested to change to --said request-- or --the request--.

Similar problem exists in claim 17, line 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The limitation "a machine readable medium" recited in line 2 is not a process, machine, manufacturer, or composition of matter, or any new and useful improvement thereof because there is no physical

structure/connection of computer software recited in the claim. To overcome this rejection, it is suggested to applicant to change it to --a computer readable medium--.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 5-7 and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Colby, et al (US 6,449,647).

Regarding claims 1 and 5-7, Colby discloses a method of processing a request to at least one server, comprising the steps of:

receiving a request (col. 2, lines 55-56); and

scheduling submission of the request to the at least one server (col. 2, lines 58-59) based on: (i) a quality-of-service (QoS) class assigned to a client from which the request originated (col. 7, lines 57-58; col. 20, lines 58-61); (ii) a response target associated with the QoS class (col. 9, lines 25-32; col. 21, lines 50-51); and (iii) an estimated response time associated with the at least one server (col. 22, lines 10-11), as recited in claim 1;

further comprising the step of assigning the response target to the QoS class (Table 1; col. 9, lines 25-39; col. 22, lines 10-11), as recited in claim 5;

wherein the step of assigning the response target to the QoS class further comprises the step of assigning a response time target to the QoS class. (Table 1; col. 9, lines 25-39; col. 22, lines 10-11), as recited in claim 6;

wherein the step of assigning the response target to the QoS class further comprises the step of assigning a response percentile target to the QoS class. (col. 16, lines 56-61 and 65-66), as recited in claim 7.

Regarding claim 14, Colby further discloses an apparatus for processing a request to at least one server, comprising:

a memory (RAM per Fig. 23, element 110); and

at least one processor coupled to the memory (Fig. 23, element 1080) and operative to perform the method of claim 1, and is therefore rejected under the same reason set forth in the rejection of claim 1.

Regarding claim 15, Colby further discloses the apparatus of claim 14, wherein the memory and the at least one processor form a scheduler (Fig. 1b, element 110) that is external to the at least one server (Fig. 1b, elements 100).

Regarding claim 16, Colby further discloses the apparatus of claim 15, wherein the scheduler is a front-end scheduler and the at least one server is a back-end server (Fig. 1b, elements 110 and 100; col. 16, lines 28-29).

Claim 17 is an apparatus claim corresponding to method claim 1 and is therefore rejected under the same reason set forth in the rejection of claim 1.

Inventorship

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-4, 18-20 and 25 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647) in view of Bender, et al (US 6,112,221).

Regarding claims 2-4, Colby discloses all of the subject matter as disclosed in paragraph 5 of this office action except for the following:

further comprising the step of withholding the request from submission to the at least one server when the request originated from a client assigned to a first QoS class to allow a request that originated from a client assigned to a second QoS class to meet a response target associated therewith, as recited in claim 2;

determining a throughput of the at least one server; and

reducing a request withhold rate to increase throughput of the at least one server, as recited in claim 3;

monitoring a throughput of the at least one server; and

varying a request withhold rate to balance the throughput and request response times, as recited in claim 4.

Bender from the same or similar fields of endeavor discloses a server which employs a pre-emptive setting not continuously processing a request, but scheduling them according to an earliest deadline first methodology, by alternately processing the request with the earliest deadline first, followed by that with the next earliest deadline, and so on (col. 4, lines 52-58; col. 5, lines 27-35), calculating processing time and dead line for each request (Fig. 2, element 102), and continue adjusting estimated processing time (Fig. 2, element 112).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the request processing method of Colby with the pre-emptive scheduling method of Bender by pre-empting the request having a lower QoS

class with the request having a higher QoS class, monitoring the throughput of the servers, and adjusting the pre-emption rate so that the request can be processed within the target response time. The motivation for using pre-emptive procedure would have been to prioritize requests according to response target.

Claim 18 is a substantial duplicate of claims 1 and 2 combined and is therefore rejected under the same reason set forth in the rejection of claims 1 and 2.

Claims 19 and 20 are substantial duplicates of claims 3 and 4, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 3 and 4, respectively.

Claim 25 is a substantial duplicate of claims 1 and 2 combined and is therefore rejected under the same reason set forth in the rejection of claims 1 and 2.

9. Claims 8 and 10-12 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647) in view of Veres, et al (US 6,807,156) and Menditto et al (6,981,029).

Regarding claims 8 and 10-12, Colby discloses all of the subject matter as disclosed in paragraph 5 of this office action except for the following:

further comprising the step of estimating the response time associated with the at least one server based on one or more requests sent to the at least one server within a given time period, as recited in claim 8;

determining dispatch times for requests from a difference between at least one predicted response time of the at least one server and the target response time corresponding to the QoS class of the request; and

sending requests to the at least one server based on dispatch times, as recited in claim 10;

wherein a plurality of applications are running on the at least one server and requests are routed to applications, further comprising the steps of:

estimating response times of applications based on one or more requests sent to the applications within a time period; and

sending a request to an application whose estimated response time is not greater than a target response time corresponding to the QoS class of the request, as recited in claim 11;

further comprising the step of varying a number of requests sent to applications so that estimated response times of applications are not greater than target response times of QoS classes corresponding to requests sent to the applications, as recited in claim 12.

Veres from the same or similar fields of endeavor discloses further comprising the step of estimating the response time (col. 13, lines 46-47) associated with the at least one server or applications based on one or more requests sent to the at least one server or applications within a given time period (time window of measurement as shown in Fig. 2; col. 13, lines 36-47).

Menditto from the same or similar fields of endeavor discloses a content gateway selecting a server that can deliver with an acceptable response time (col. 2, lines 64-66). Examiner takes official notice that it is well known in the art that having an acceptable response time means the actual time it takes an application or server to process a request is less than the expected time to process a request.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the request processing method of Colby with the response time estimating method of Veres and the QoS enforcement approach by Menditto by periodically sending requests to the applications and servers to estimate the response time, and selecting a server that can timely process the request. The motivation for such a combination would have been to ensure service level agreement based on response time is met.

10. Claim 9 is rejected under U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647).

Regarding claim 9, Colby discloses all of the subject matter as disclosed in paragraph 5 of this office action except further comprising the step of assigning a target response time to a plurality of QoS classes in which lower quality classes are assigned larger response times than higher quality classes.

However Colby discloses QoS classes based on delay, whereas lower quality class is assigned higher delay (QoS class 3 with delay of 500 ms per Table 1) than higher quality class (QoS class 1 with delay of <250 ms per Table 1). Examiner takes

official notice that it is well known in the art that delay is proportional to response time in terms of processing a request by a server.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the request processing method with the QoS assignment based on response time by assigning larger response times to lower quality QoS classes of requests. The motivation for such implementation would have been to ensure service level agreement based on response time is met.

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647) in view of Veres, et al (US 6,807,156) and Menditto, et al (6,981,029) as applied to claim 11 above, and further in view of Lu, et al (US 6,772,211).

Regarding claim 13, Colby, Veres and Menditto disclose all of the subject matter as disclosed in paragraph 10 of this office action except wherein the at least one server comprises a plurality of servers and each application runs on a different one of the plurality of servers.

Lu from the same or similar fields of endeavor discloses methods to switch client packets to one server among a group of servers (col. 4, lines 50-53) and applications have their own dedicated servers (col. 5, lines 24-26).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the packet processing method of Colby, Veres and Menditto with the servers and applications of Lu by implementing the method and each

application on a separate server. The motivation for such a combination would have been to modularize the features for scalability and performance.

12. Claims 21-23 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647) and Bender, et al (US 6,112,221) in further view of Veres, et al (US 6,807,156) and Menditto et al (6,981,029).

Claims 21-23 are substantial duplicates of claims 10-12, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 10-12, respectively.

13. Claim 24 is rejected under U.S.C. 103(a) as being unpatentable over Colby, et al (US 6,449,647), Bender, et al (US 6,112,221), Veres, et al (US 6,807,156) and Menditto et al (6,981,029) in further view of Lu, et al (US 6,772,211).

Claim 24 is a substantial duplicate of claims 13 and is therefore rejected under the same reason set forth in the rejection of claim 13.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following documents are cited to show system pertinent to applicant's invention.

Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name
US-6,006,264 A	12-1999	Colby et al.
US-2002/0010798 A1	01-2002	Ben-Shaul et al.
US-2002/0019843 A1	02-2002	Killian et al.
US-6,430,156 B1	08-2002	Park et al.
US-6,628,610 B1	09-2003	Waclawsky et al.
US-6,658,453 B1	12-2003	Dattatri, Kayshav
US-2004/0111506 A1	06-2004	Kundu et al.
US-2004/0193472 A1	09-2004	Ramakrishnan et al.
US-2004/0205752 A1	10-2004	Chou et al.
US-6,862,624 B2	03-2005	Colby et al.
US-6,877,035 B2	04-2005	Shahabuddin et al.
US-2005/0207439 A1	09-2005	Iyengar et al.
US-6,968,389 B1	11-2005	Menditto et al.
US-6,978,311 B1	12-2005	Netzer et al.
US-7,082,463 B1	07-2006	Bradley et al.
US-7,140,016 B2	11-2006	Milovanovic et al.
US-7,257,634 B2	08-2007	Colby et al.

Borzemski, Leszek and Krzysztof Zatwarnicki, A Fuzzy Adaptive Request Distribution Algorithm for Cluster-based Web Systems, Proceedings of the Eleventh Euromicro Conference on Parallel, Distributed and Network-Based Processing (Euro-PDP'03), IEEE 2003

Ludwig, Heiko, Web Services QoS: External SLAs and Internal Policies Or: How do we deliver what we promise?, Proceedings of the Fourth International Conference on Web Information Systems Engineering Workshops, IEEE 2004

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luat Phung whose telephone number is 571-270-3126. The examiner can normally be reached on Monday to Friday, 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on 571-272-3171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LP

Ton

DANG T. TON
SUPERVISORY PATENT EXAMINER